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VasOx

Role of oxidative stress for neuro-vascular function

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Blockage of a cerebral artery causes injury to the brain, a disorder termed "ischemic stroke", which affects many millions of people every year worldwide. Medical doctors reopen the blocked artery to minimize brain damage from ischemic stroke. However, the sudden reopening of the blocked artery may cause additional brain damage by flooding the brain with oxygen. Too much oxygen results in the formation of "reactive oxygen species" (ROS) and "free radicals" thereby causing further damage to brain tissue. The high reactivity of ROS and the lack of suitable tools to monitor and quantify ROS undermined to study when and where cells produce ROS after stroke. The applicants of the current project developed a genetic tool that permits simultaneous generation and detection of ROS in individual cell populations of living tissue. The current experimental program aims to take advantage of these "chemogenetic" tools to identify the cells which produce ROS after ischemic stroke, to uncover the genes activated by ROS production, and to screen antioxidant compounds which inactivate ROS. This knowledge will pave the way for developing specific drugs against ROS-induced brain damage after stroke.